MISSOURI BOTANICAL GARDEN BULLETIN

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Office of publication: 306 E. Simmons Street, Galesburg, Illinois.

Editorial Office: Missouri Botanical Garden, 2315 Tower Grove Avenue, St. Louis 10, Missouri.

Published February, March, April, June, September, and November by the Board of Trustees of the Missouri Botanical Garden. Subscription price: $2.50 a year.

Entered as second-class matter January 26, 1942, at the post-office at Galesburg, Illinois, under Act of March 3, 1879.

Missouri Botanical Garden Bulletin

Vol. XLV JUNE, 1957 No. 4

PATIO GARDENS

LADISLAUS CUTAK

In Mexico, even the humblest of dwellings has a patio—a courtyard surrounded by the walls of the house. The living rooms of the family are usually on the first floor, with the sleeping quarters opening on a second-story balcony which overlooks the courtyard. The balcony is supported by wooden posts, sometimes ornately carved, or by marble or cement columns. The areaway beneath the balcony is paved with brick, stone or sometimes tile, and is equipped with tables, chairs and benches. Frequently, bird cages and baskets of plants—orchids, bromels, and ferns—are hung around the outer edges of the balcony.

The patio itself is paved, usually in a different design from that of the walk beneath the balcony. The patio can be and usually is decorated with plants in a variety of homemade containers that can be shifted about to produce different effects. Soil beds, often raised slightly above the floor and filled with either flowering or bright-foliage plants, may be arranged in geometric patterns about the court. The center is marked by a circular flower bed, a pool, a fountain, a statue on a pedestal, or some other ornament; although a pool or fountain seems to be the basic centerpiece associated with all patios, large or small. The walls of the pool may be only a few inches in height, or at times as much as a foot high, in which case plants are set upon the curbing. Some of the more ornate homes of the wealthy have a series of patios opening one into the other, connected by an arch or a door through the wall. These passageways lend an old-world atmosphere to the beauty and cloistered serenity of the brick-walled garden.

The patio is a perfect link between house and garden. The editor of a well-known magazine *(Flower Grower)* calls it a unifying device because such an area itself is a wedding of the house and garden, being both an extension of the living quarters to the out of doors and of the garden into the house. It offers peace, quiet, and privacy. Even if built in the noisy business section of a modern city such a garden shuts out the loud noise of a hustling world. In some of our southern towns one may find restaurants, small hotels, and offices, especially medical offices, built around patios. However, patios need not be confined to any particular locality. In modified form they can be adapted to almost any part of the United States. They need not be enclosed entirely by the house walls. Some have the house on two or three sides with a high fence, or a hedge, completing the enclosure. In all cases, the patio brings

the garden into intimate contact with the house and makes it a part of daily family life.

One will find patios in Mexico, southern France, Spain, Latin America, and in fact most regions where Spanish architecture and influence still prevail, as in southern United States. The charm of small patios is nowhere better exemplified than in the French Quarter of New Orleans. I was amazed at the delightfully colorful courtyards that exist behind the drab walls that are seen from the streets. The visitor to the Crescent City will get only glimpses of the lovely patios through locked gates unless he has friends living there or happens to be present during the Spring Fiesta when some of the charming homes and patios are opened. In some courtyards tall trees provide shade and there are Bougainvilleas and other tropical vines trained against the walls to impart a dash of color. Sometimes the walls are clothed with espaliered citrus trees on which both fruit and flowers appear. Also, ivies cling tenaciously to the rough walls and climbing aroids such as *Monstera deliciosa* (Swiss Cheese Plant) and *Scindapsus aureus*, along with Syngoniums, make striking wall-covers. A clump of bananas may be found in a corner with smaller-growing large-leaved plants like Strelitzia, Heliconia and Alpinia forming a background for ferns and crotons of every hue. Oleander and Hibiscus are either planted in tubs or directly in the soil. In addition, there are many flowering and foliage plants that fit into the *décor* of a patio.

To our neighbors below the Rio Grande, a patio is an integral part of every hotel and home. The courtyards are beautifully planted and elaborately ornamented with various bric-a-brac which seem to fit into the general design. The climate is ideal and a great variety of plants can be used. In spacious patios, palms such as Washingtonias are often utilized. They may be seen towering 30 to 40 feet high, their bulky trunks draped with philodendrons or hung with flamboyant orchids and decorative species of bromels. Clay pots of every description, painted and unpainted, are filled with sweet-scented Gardenias, Lantanas, Verbenas and bulbous Lilies and Amaryllis. Tinkling fountains add to the charm and harmonize with the songs of caged and wild birds that nest in the patio trees.

Although patio gardens are more suited to warm climates, I shall attempt to show that they are practical even in our Midwest. I know only one in the St. Louis area that has all the charm of the tropical ones. It belongs to Mr. Edwin Lemp whose home is situated high on a bluff of the Meramec River overlooking Sylvan Beach. Mr. Lemp, by erecting a glass roof over his patio which is entirely surrounded by the living quarters, has produced a climate such as that found in a greenhouse. A circular pool containing aquatic plants and a tiny figurine occupies the center of the patio. Large flower beds are built into the corners where permanent plantings include some of the choicest foliage plants available. One bed is entirely given over to succulents—mostly Sansevierias, Agaves, Gasterias, Pedilanthi,

and some Cacti. Another bed is completely covered with lush growth of *Scindapsus aureus* which also clambers up a column to the rafters above. *Spathiphyllum Kochii* with coriaceous, shiny, oblong-lanceolate leaves is used extensively as a border and in other beds. Different kinds of Ferns from the common house Holly *(Cyrtomium falcatum)* to the dainty Maidenhairs (*Adiantum* spp.) are abundant and a few are scattered about in pots. Begonias, African Violets, and other potted plants are placed on stands, tables and benches. Plants notable for their bold foliage such as Monstera, Tetrapanax, and arborescent Philodendron are planted at the base of columns or in conspicuous spots imparting a jungle-like aspect to the whole area. Since the patio is kept fairly moist and warm all year round it is possible to keep and grow a number of ornamentals which would not thrive in cooler and drier surroundings. Mr. Lemp also is interested in birds and has several colorful cockatoos on perches in the patio. It is nigh impossible to transplant a Mexican patio outright into our Midwest, but Mr. Lemp has done it easily on his country estate. How lovely it must be to wake up in the morning and step into this private garden without first dressing.

The idea for the design of the tropical Bird House at the St. Louis Zoo was borrowed from Mr. Lemp's indoor patio. This bird house is a model of beauty and utility. It is a man-made swamp 30 feet deep, 40 feet wide and 25 feet high. The floor is of natural

Atmospheric conditions, such as found in conservatories, permit exuberant growth to develop in the indoor patio of Edwin Lemp's home on the bluffs of the Meramec near St. Louis.

earth in which tropical and sub-tropical trees and shrubs are planted. There are pools bordered by rocks and plantings of hardier types of foliage plants. Fifteen to twenty species of birds have the freedom of the area; the plants which are damaged by the birds must be replaced frequently. It is another good example of an interior patio which can be used as a model in hotels, apartments, hospitals and even modern office buildings in the North and Middle West. In these enclosed patios, there is an infinite variety of tropical plants which can be used to good advantage. The enclosed patio is likened to a conservatory and will require identical care and maintenance.

One need not have a tropical greenhouse-type patio in the Midwest. Although the use of winter-hardy plants and the extreme effects of seasonal variations will make the patio a departure from the southern garden, nevertheless the patio-atmosphere can be obtained. One St. Louis landscape architect, Robert E. Goetz, who has planned and produced many nice patios for outdoor living in the Greater St. Louis area, specializes in a modified form of patio garden to fit contemporary homes. Mr. Goetz believes that a patio-garden is not only enjoyable and livable because of the pleasure the plants give, but it is an easy, convenient way to garden. He further states that when plant beds are built into the actual patio area and surrounded by permanent edgings such as brick, stone, or corrugated asbestos, the plants are accessible. The permanent edgings make it possible to mulch deeply, thus adding to the happiness of both plants and gardener by eliminating weeds, keeping the soil cool, and conserving moisture.

Patio of Mr. O. E. Goetz designed by Mr. Robert E. Goetz. Photo courtesy Mr. Robert E. Goetz.

Mr. Robert E. Goetz with his family at home in the patio which he designed. Photo courtesy Mr. Goetz.

Home-owners with modest budgets and a little talent can build a patio-garden for about one-third to one-half the cost of a professionally built one. However, my advice would be to pay the comparatively small fee a competent landscape architect charges for designing a garden. With his knowledge of engineering, building materials and plants he can not only create a beautiful and functional garden but probably also save the home-owner many costly mistakes.

In the contemporary patio ivy can be trained to creep upon the enclosing walls and fences. Trellises for climbing roses can also be set at intervals against the walls to hide the bareness. Evergreen shrubs with good substantial green foliage are always desirable—the Hollies and Mahonias are excellent material. *Ilex cornuta* 'Bufordi' with its large, glossy, deep-green foliage is a fine ornamental which can grow in sun or shade. A slow-growing Texas Barberry, *Berberis trifoliolata*, merits a trial if you desire something rare in this climate. It is a compact shrub with thick rigid leaves of greenish grey, with long spines or teeth on the edges. I have grown it for 15 years in my backyard without it ever freezing to the ground. Many other hardy plants are adaptable to the patio garden and gardeners with knowledge of and experience with the Midwest plants will have preferences of their own.

A contemporary patio garden in this area need not be devoted strictly to hardy plants; although, I must admit, it might prove more economical. The inclusion of several tropical plants will greatly enhance a patio. When a pool or fountain is included, aquatic plants

could be allowed to adorn the surface of the water; Water Lettuce, Water Poppy, Water Hyacinths and Parrot's Feather are ideal for the purpose. If a pool or fountain is not desired, a raised bed for flowers is recommended. A tree can be planted in a square or circular hole provided in the paving and tropical epiphytic cacti and other shade-loving plants can be suspended from the trunk and branches during the summer. Oleanders, Hibiscus and Ficus, in tubs mounted on castors, are also advocated for the patio.

Another Goetz-designed patio. Photo courtesy Mr. Goetz.

ONE WAY TO CONTROL DANDELIONS

G. H. BISHOP*

THE FOLLOWING procedure does not claim to eliminate dandelions; but it will enable you to hold your own against them and the dandelions will hold their own against you so that the battle with them will finally come to a draw. Two principles are fundamental: any dandelion that blossoms, dies; and, no dandelion goes to seed on your domain.

So, you get (1) a six-quart sprayer and put a three-foot rod on it with an ordinary spray nozzle on the end (to enable you to reach the ground without stooping), (2) a gallon oil can with the top cut out, and (3) a can of

* Dr. Bishop of the Department of Neurology and Psychiatry at Washington University School of Medicine is an excellent amateur gardener and we are impressed with his stimulating method of controlling dandelions.

2-4-D concentrate. Into the gallon can put one tablespoon of kerosene or furnace oil (modern fuel oil is the refuse from gasoline as sausage is from porkchops; but at least it is still greasy, and it sticks to dandelions like a stray dog to a garbage can), one large tablespoon of Ivory soap flakes, four to six tablespoons of 2-4-D, and fill with water, preferably soft and warm. Dump the mix into the sprayer and pump up to only moderate pressure and you're set. Ignore instructions on labels, for they give somebody else's methods. Don't drench the dandelions: one brief shot from the nozzle trigger held three inches above the weed and that plant will surely die. And don't hit anything else; this is strong medicine! When you can spray wild garlic out of the lily patch you have acquired the technique; but it is cheaper to try your practice shots among the shrubbery.

Now prepare a large paper sack by rolling the edge so it won't tear when you slap the mosquitoes and jerk it. Grasp the carrying handle of the sprayer with four fingers, the edge of the sack between thumb and handle, the nozzle wand with the other hand, and squirt a fine spray on each of the first five dandelions you meet. Then drop the nozzle, slap the mosquitoes, and bend your proud back to pick off every yellow head from those five plants and put them in the sack. Proceed to five more until you have them all. Repeat every other day until no more yellow heads appear, even on the plants sprayed last time—they can make seed even when sick. The first five years are the hardest for by that time you will have reduced the population to a manageable level.

To accomplish a comparable job by spraying all over is more expensive, is impossible where there are other plants, kills clover in the lawn, is less effective, lacks the personal touch and fails to satisfy the urge to kill; besides some of the dandelions will elude you and go to seed anyway. Every seedhead that blows away is a job for next year and you can rely on your neighbor's dandelions to keep you sufficiently supplied. After five years of slaughter, the yield should be about two quarts to a gallon of spray every half hour (if you are a spry walker) from an acre of ground—with the average neighbors.

The best time to hunt dandelions is when the mosquitoes are biting, which at this time of the year is between six and eight a. m. sun time. Some people can fool themselves that they are saving daylight by setting their clocks ahead; but nobody, except Joshua, ever stopped the sun and you can't fool the dandelions. These same people think mosquitoes bite in the evening; but that is when they are tired and are just looking for a nightcap. Breakfast is their heavy meal. You will need boots or to go barefoot for the dew is heavy and the gray heads shed their seeds when they dry out. This is also the ideal time to play golf, and slaying dandelions relieves you of that obligation. You get the pleasant walk, the fresh air, and the bird songs. Also, stooping to pick heads is as good as looking for golf balls in the tall grass and is a lot cheaper and gives you something for your money. If your

back recovers in two days so you can do it again you don't need a doctor. It will keep you savagely busy mornings until the mornings are so hot you wouldn't play golf anyway; but this is as far as this method goes. If you have dandelions you will have other things to do later such as watering the grass and killing moles. Incidentally, while one can trap moles, sitting on the grass with a cool drink waiting for them to wiggle, then digging them out appeals to some people especially after dandelion time when it really gets hot. This offers a continuing opportunity to further exercise your aggressive instincts without alerting the police.

Killing dandelions is one of the best ways of enjoying your landscape. You see it in detail repeatedly and really get acquainted with it. You can combine dandelion-slaying with bird-watching which may justify the latter (the Forest Park police once arrested an early-evening bird-watcher for snooping in the bushes and charged him with disturbing the peace); but I find that most of the birds get along all right without being watched. On your travels you will meet wild onions, yellow dock, chickweed and plantain, not to mention horseweed and wild lettuce, and other enemies which you can take a shot at in passing; but no need to stoop over to pick the flowers for they won't go to seed before they die. I find it helps to name various weeds by names of people I don't like. A passing shot is equivalent to a sneer. But dandelions are my dish; I just call them *Hoi polloi, canaille* or other terms of general disapproval. One has to get more or less personal to make this method work successfully and a good strong expression of animosity helps keep up the morale. I save my best invectives for those gray-headed *so-and-so's* that have already shed some seeds—those I missed the last time. Even as in golf, you have to keep your eye on the ball to make a perfect score.

But, of course, most people, especially the neighbors, won't take the trouble. This is why there are so many dandelions.

MISSOURI OZARK PLANTS IN ILLINOIS

ROBERT H. MOHLENBROCK

Butler's Quillwort

Although the unique Ozarkian flora is confined chiefly to a wide band extending from near St. Louis southwestward through Missouri and into neighboring Arkansas and Oklahoma, a few species have managed to cross the Mississippi River and make themselves rare members of the western Illinois flora. Some of these are in such a tenuous position that only one or two plants are known to exist in Illinois. For the most part, Ozark species had not been found in Illinois until recent years when more intensive collections were begun.

On some of the limestone glades throughout the Ozarks, a peculiar plant about five to ten inches high is occasionally found. From all outward

appearances, it looks to be a juvenile grass or sedge which has found a moist depression to its liking on a small ledge. However, if the plant is removed carefully from the thin soil, at its base will be found a two-lobed corm bearing roots. Near the base of each grass-like leaf is an inflated area in which may be found many extremely tiny spherical spores. This spore-bearing plant is related to the ferns, a fern-ally, and is known as *Isoetes butleri* or Butler's Quillwort, from the similarity of the leaves to a quill. It appears during March and by the middle of June it usually has disappeared completely.

This species was unknown to Illinois until one brisk morning in April 1953, when Dr. John W. Voigt, ecologist at Southern Illinois University, spied a little grass-like plant growing in moist depressions of a bluff at Giant City State Park in Jackson County, Illinois. On close examination this remarkable plant turned out to be Butler's Quillwort. Since that time, Dr. Voigt and I have discovered this fern-ally in four additional places in southern Illinois. It is interesting that all locations on which it is found in Illinois are St. Peter sandstone rather than limestone; however, it may be that the sandstone regions in Illinois have moisture conditions similar to those of the limestone glades of the Ozarks.

Flower-of-an-Hour

If you happen to be exploring on exposed sandstone bluffs or limestone glades in the Missouri Ozarks some summer afternoon between one and four o'clock, you may find yourself suddenly surrounded by curious little plants with bright pink flowers. The flowers are borne in clusters atop a slender stalk which arises from a clump of narrow succulent leaves. The plant, *Talinum calycinum,* is called Flower-of-an-Hour because each flower opens for only a few hours in the afternoon. Although looking like a typical desert plant, it actually belongs to the same family (the Portulacaceae) as our very common Spring Beauty (Claytonia)

Flower-of-an-Hour. Photo courtesy Dr. J. W. Voigt, Southern Illinois University.

and the Moss Pink *(Portulaca grandiflora)* which can withstand heat and drought.

Flower-of-an-Hour was first known in Illinois in the fall of 1954 when I found a single plant growing in thin soil along the edge of a sandstone bluff known as Castle Rock. Castle Rock, an interesting formation which arises above the surrounding land, is located in Randolph County near Leanderville, some 60 miles southeast of St. Louis and scarcely 10 miles from Missouri. Hoping to find additional plants, I returned to the same area the week following my discovery and found between 150 and 200 plants, about half of which were in full flower! This is the only place in Illinois where Flower-of-an-Hour has been found to occur, although similar habitats seem plentiful.

Shortleaf Pine and Harvey's Buttercup

On the morning of April 24, 1954, I was fortunate to be a member of a party of three who were botanizing a section of the state where they had not been before. The place was Piney Creek and was located near the small village of West Point, Illinois, in Randolph County. There was a particular reason for our going to "Piney" for, as the name indicates, pine trees occurred there, and in southern Illinois a pine tree is a rare thing! The Shortleaf or Yellow Pine is a species common to southern Missouri, but known in Illinois only in Piney Creek and in the Pine Hills of Union County. Because of the easy access to the Pine Hills, most naturalists in the area are familiar with the pines which grow there. Although for several years pines have been known to occur at Piney Creek they have been seen there only rarely due to the ruggedness of the area.

Shortleaf Pine, with the author. Photo courtesy Dr. Voigt.

After leaving a country lane, we walked down a great rocky, exposed, south-facing slope to get to Piney Creek. We found the slope virtually covered by Bird's-foot Violet *(Viola pedata)*. Both kinds were there—the one with three pale-lavender and two purple, velvet-like petals was most common, although occasionally we saw the all-lavender variety. At this stage, Piney Creek was rather small with the violet-carpeted slope on one side and an open field on the opposite; but as we followed the creek westward, it took us the way it must have gone for

thousands of years as it cut its way through a tremendously large sandstone bluff. The creek itself has mostly solid rock bottom all along its course with occasional drop-offs of one to ten feet, at the bottom of which are shallow or deep pools of rather clear water. There are numerous "pock-holes" in the creek floor and here and there are long, deep grooves, as from the scratching of some giant prehistoric animal when the stream bed was still soft; and even in the middle of the summer there is often a little water in these depressions.

American Aloe. Photo courtesy Dr. Voigt.

Harvey's Buttercup. Photo courtesy Dr. Voigt.

As we walked along the narrow space between the creek and the bluff on our right, we observed on the ledges such species as the American Aloe or Agave *(Agave virginica)* and the Yellow Star-grass *(Hypoxis hirsuta)*. Finally we came to our goal—our first Shortleaf Pine! It was only about ten feet tall, clinging desperately to the side of a steep cliff. We searched the bluffs, which now completely surrounded us, for other pines; but, seeing none, we continued along the creek.

Then, quite by accident, I spotted a not too-unusual-looking buttercup growing among the Agaves near the base of a slope. When I examined it more closely, I realized it was a species I didn't know; and it was then for-

gotten in the vasculum or collecting can until I returned home, when I identified it as a new buttercup for Illinois. It was Harvey's Buttercup *(Ranunculus harveyi)*, an Ozark species known previously from southern Missouri, Arkansas, and Oklahoma. Later visits to Piney Creek rewarded us with many more plants of Harvey's Buttercup. More recently, it has been found by the author along Rock Castle Creek in Randolph County and near Ava in Jackson County.

After discovering the buttercup, we came to the most rugged portion of Piney Creek and were awe-stricken by several large trees of the Shortleaf Pine. These trees, many undoubtedly very old, were scattered along the cliffs ahead of us, and there was an abundance of seedlings beneath them.

In addition to the species mentioned above, a new sedge for Illinois *(Carex torta)* was found growing along the edge of Piney Creek. Subsequent visits to that area have produced other new plants for the state, including the very rare fern, Bradley's Spleenwort *(Asplenium bradleyi)*, and a wild blackberry *(Rubus alumnus)*. Many of these newly-reported plants are known to be common in the Ozarks.

Bird's-foot Violet. Photo courtesy Dr. Voigt.

THE GINKGO

AN ANCIENT TREE FOR A MODERN WORLD

R. L. SCHUMANN

THE GINKGO, a sole survivor of an ancient plant group, was apparently saved from extinction by a religion. Its relatives are known only as fossils and it has existed almost unchanged for so long that it is sometimes called a "living fossil". Thousands of years ago during the Triassic period (the age of the first dinosaurs) of the Mesozoic Era, the Ginkgo and

its relatives flourished. There are some indications of the group even farther back in the Permian period of the Paleozoic Era. As evidenced by the many fossils of Ginkgo occurring in Triassic and Jurassic rock throughout the British Isles, in Greenland, and in the United States, especially along the northern Pacific Coast, its distribution must have been quite extensive. Some of the fossil leaves have many lobes whereas the existing form is two-lobed; otherwise the ancient forms differed from the present-day Ginkgo only slightly. With changes in world climate, the Ginkgo retreated until only a small area served as its last stronghold. Groves of trees such as the Ginkgo, served as early temples and the Buddhist priests cultivated the Ginkgo in the temple gardens. This intentional propagation of the Ginkgo is apparently responsible for its continued existence, for, although eastern China seems to have been its last retreat, no wild stands have been found there. It was discovered in 1690 by Dr. Kaempfer, a surgeon with the Dutch East India Company, around these Buddhist temples.

The name Ginkgo, sometimes spelled Gingko, seems to have been coined by Kaempfer. *Yin-hing* is listed as a Chinese name; *yin* meaning silver and *hing*, fruit or apricot which the ripe seed somewhat resembles. It belongs to the Class Gymnospermae, Order Ginkgoales, Family Ginkgoaceae and is represented by a single species—*Ginkgo biloba*. Four varieties are recognized: *fastigiata*, with stiff erect branches; *laciniata*, with more deeply cut leaves; *pendula*, with weeping branches; and *variegata*, with poorly-marked yellowish stripes on the leaves.

In 1784 the Ginkgo was introduced into the United States. A tall tree, it frequently reaches 60–75 feet and there are accounts of specimens as tall as 100 to 120 feet. Its general appearance is somewhat similar to our conifers—the shape is conical and the horizontal branches arise in whorls. Young trees may be irregular but age brings more symmetry. These trees appear sparsely branched. Along the larger branches grow many extremely short branches or short shoots. From a

Ginkgo in winter, illustrating short-shoots.

terminal bud on these short shoots the new year's leaves emerge in clusters or swirls. Since there is practically no stem elongation, the short shoots increase in length from year to year only very gradually. Upon examination, the leaf scars of previous years are seen to be condensed as they are on the trunks of certain palms. Interspaced

at odd intervals on the branches are somewhat longer branches or long shoots. These long shoots continue to grow terminally for a number of years, but they produce lateral short shoots after approximately two years. Occasionally a long shoot will arise from the

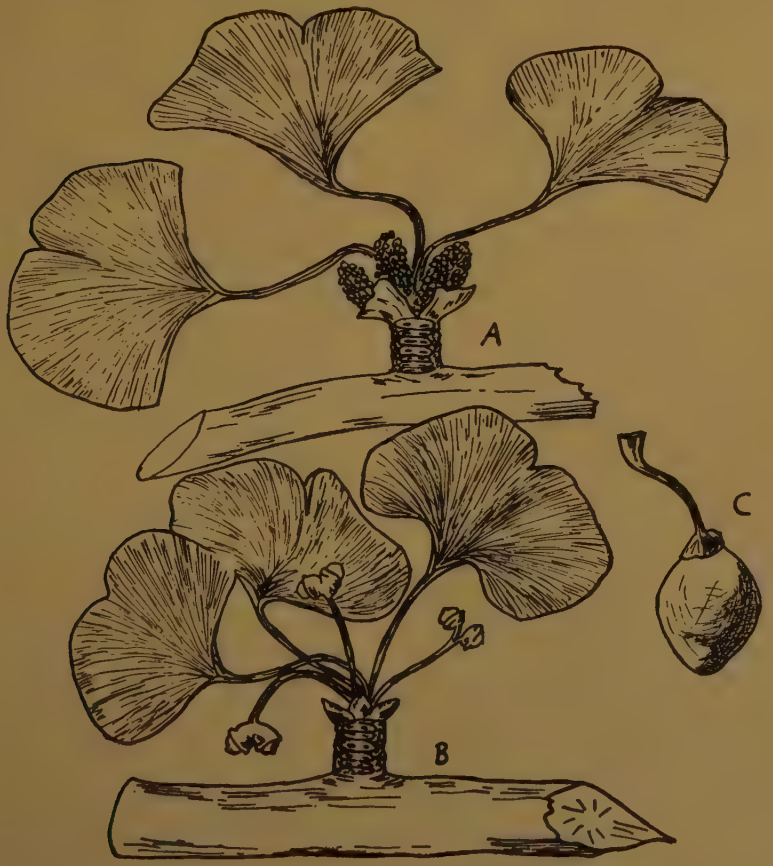
Main trunk of Ginkgo showing whorled branches.

terminal bud of a short shoot. The leathery, ribbed, fan-shaped leaves are similar to those of the Maidenhair fern from which the Ginkgo gets the common name, Maidenhair Tree. These light green leaves averaging 2–4 inches in width are longitudinally veined and cleft slightly at the apex forming a two-lobed blade. Although in general habit and appearance the tree resembles a conifer, unlike most conifers, it is deciduous, the leaves turning bright yellow in autumn. In late spring when the leaves are half grown, strobili, or cones may appear at the tips of short shoots. Male and female strobili are borne on separate trees. The male cones consist of many pairs of pollen-bearing sporangia called microsporophylls. The female strobilus consists of a small cluster of sporophylls each with two egg-bearing structures or ovules. Wind-borne pollen functions in fertilizing the egg within the ovule. Not infrequently both ovules will develop into seeds, although one usually aborts. The drupe-like yellow-orange seed (falsely called a "fruit" because of its fleshy outer wall) develops to about one inch in length. A high content of butyric acid in the fleshy layer causes it to become putrid. Notwithstanding this fetid odor the Chinese are noted to use its flesh in preserves and to serve it as an aid to digestion between courses at meals. The nut-like inner part is also considered a delicacy; when roasted it is said to taste like maize.

These trees are easily started from seed, and because of their tough seed-coat, stratification is recommended by some horticulturists. Since the seeds fall from the trees before they are fully mature, they will not germinate if planted immediately. Seedlings can be started in cold-frames or in other sheltered places. Some sources indicate that the trees do best in rather dry loam; however, they seem to do well in any relatively good soil. In dryer areas they may require watering. Varieties and definite sexes where one is preferred are best secured by grafting or budding. The grafting is done in the spring on seedlings raised in a warm house. After grafting, the plants should be frequently sprayed with water from above, and shielded

from the sun until a true union is made. Other methods of propagation which have been successful and which are more rapid are by layering and cuttings.

The Ginkgos are successful street trees since they are unaffected by air pollution. In addition to being easy to propagate they are easy to transplant, free from insect and fungus pests, long-lived, and, because of their moderately strong wood, are resistant to sleet and ice storms. On the other hand, they are extremely slow-growing.



A. Short-shoot with male cones. B. Short-shoot with ovules. C. A seed.

Male trees are usually preferred, especially for street planting, because of the objectionable seeds on the female trees.

Several beautiful specimens of Ginkgo trees may be seen at the Missouri Botanical Garden and in Tower Grove Park in St. Louis. Probably the most famous plantings of these trees are in Washington, D. C., where they line the walk in front of the United States Department of Agriculture. *(From a paper prepared for Mr. Robert Gillespie's class in Horticulture at Washington University.)*

BOOK REVIEWS:—

The Ferns and Fern Allies of British Columbia. By T. M. C. Taylor. British Columbia Provincial Museum, Handbook no. 12. Victoria, B. C., 1956. 50¢.

Ferns of the Ottawa District. By W. J. Cody. Canada Department of Agriculture, Ottawa, 1956. $1.00.

Ferns and Fern Allies of Texas. By Donovan S. Correll. Texas Research Foundation, Renner, Texas, 1956. $5.50.

EACH OF these three books can be highly recommended as a reference or for use in or near the area covered. The first two are essentially pocket field guides and provide the means for easy identification of the species, and additional information about their distribution and habitats. They are both well illustrated. The third is more pretentious, following the format of the Flora of Texas from which it has been reprinted with the addition of an excellent introduction. It is a more technical treatment, including specimen citations, lists of synonyms and quite detailed descriptions; but the fine illustrations, the keys and the discussions will make it equally useful for the non-professional person.

—Rolla Tryon

A Field Guide to the Ferns. By Boughton Cobb. Houghton Mifflin Co., Boston, Mass., 1956. $3.75.

THIS BOOK on the ferns and fern allies of the northeastern United States and adjacent Canada is an unfortunate addition to the Peterson Series, which otherwise has a wide and well deserved reputation for excellence. Neither does it do credit to the rapidly growing list of fern books intended in part or wholly for the non-professional user. The illustrations of each species by Laura Louise Foster and brief chapters on "Ferns in the Flower Garden" by H. Lincoln Foster and "Ferns and Their Allies in the Past" by Theodore Just are the only redeeming features. The illustrations are perhaps worth the price of the book but the user should be wary lest his attention be diverted to the keys or descriptions. Several introductory pages of keys to the species are largely based on such general and untrustworthy characters that it is hardly possible that these keys can successfully be used. The descriptive material for each species is not only inaccurate in many places but is replete with confusion introduced by the inexact and varying use of such words as "stem", "leaf", "leaflet", "axis" and "stalk" and the use of other words with no precise meaning in botany. In a recent review in the American Fern Journal (Vol. 46 No. 4) E. T. Wherry and C. V. Morton have pointed out a few of the many objections in detail and I will not repeat them here. One quotation from the text of the Royal Fern will suffice: "At a distance this fairly common large fern is distinctly fernlike in appearance, but close up, its widely spaced, oblong leaflets make it look like a locust tree." I doubt that anyone, even the author, would ever seriously confuse the two. —Rolla Tryon

Gardening Indoors Under Lights. By Frederick H. and Jacqueline L. Kranz. 241 pp. 1 color plate, 25 plates, 12 figs. Viking Press, New York, 1957. $4.95

MUCH sound information annoyingly hidden in a maze of text. The style is easy, informal, and pleasant to read; but the material seems to be loosely organized and a bit difficult to get at. Sound advice based upon the experience of the authors and/or upon well qualified references is to be found throughout the book, but it is up to the reader to jump about, record the facts, and give them continuity. The plates—eight, by the authors—are good. The figures are clear and well done. The beginner can easily handle what technical material there is. The ability of a novice with tools seems to have been overestimated by the authors, for they make light of what will prove to be difficult work when the reader starts to build his plant case with pencil, square, saw, hammer and screwdriver. A book obviously for the eager novice, but containing much reference material useful to others, when they can find it. Nicely indexed, which helps.

—W. F. Scott

Plants Indoors. How to grow and arrange them. By C. R. Boutard. 254 pp. 57 plants illustrated. 10 full-page plates. 5 Tables. Putnam & Co., Ltd., London, 1956. 21 shillings.

THIS BOOK written for indoor gardeners in Great Britain is nevertheless most useful for America. Some of the suggestions must be passed over, for they are not valid in the average American home. Some of the recommended products are not on the American market. Some of the suggested plants are not readily available in this country. But the basic information is good. The illustrations are satisfactory. The full page plates depict situations more easily identified with Great Britain than with America, but they also present ideas which are universal in application. The five Tables alone would make the book worthwhile. Table "A" entitled "Guide for Indoor Plants" has 70 pages of information on diseases, propagation, cultivation, and country of origin of more than 170 house plants. Table "B" gives similar information on various types of begonias. Table "C" is on succulents, and Table "D" on ferns. Despite inconsistencies arising out of differences in materials and conditions here, this is a book worth owning.

—W. F. Scott

Botany for Gardeners. By Harold William Rickett. The Macmillan Co., New York, 1957. Price $4.50.

THIS BOOK grew out of a course given by Dr. Rickett at the New York Botanical Garden to a group of gardeners, nurserymen, teachers, housewives, etc. With his background of botanist, teacher, gardener, and artist Dr. Rickett is well-qualified to answer as simply as possible the questions usually put to botanists. As is logical, the first chapter begins with the seed —what it contains, how it germinates, how the roots find water, and finally the relation between growth substances (auxins) and weed killers. Other chapters explain such things as why

different plants may be propagated by different methods; the how and why, physiologically speaking, of pruning; the food of plants—why they need fertilizers and how they make use of it; the kind and purpose of flowers and "the way of a flower with a bee"; etc. One of the last chapters tells us about diseases of plants and their remedies, which necessarily includes something about fungi, bacteria and viruses. Dr. Rickett is a taxonomist and he explains the binomial system of naming plants in an appendix. Apparently, the layman can't get over the fact that the scientific name is the *real* name, and that the common names vary according to the locality. Anyway, he makes the binomial system appear simple and easily understood.

Dr. Rickett's book may not *make* more successful gardeners but it will certainly help the interested person who wants to know why and how plants and the growers of plants do this and that. The fact that Dr. Rickett knows gardening as well as botany is evident on every page. His enthusiasm is downright contagious, and one finds himself reading the book more as if it were a "story" than a textbook. —Nell C. Horner

Rauwolfia Botany, Pharmacognosy, Chemistry and Pharmacology. By Robert E. Woodson, Jr., Heber W. Youngken, Emil Schlittler, Jurg A. Schneider. 149 pp. 25 pp. illustrations. Little, Brown & Company, Boston, Massachusetts, 1957. Price $5.50.

RAUWOLFIA is one of those folk-remedies which, like Ephedra, has been used by "natives" for several thousand years and was only recently discovered by our medical men. The roots and leaves of Rauwolfia have long been used in India for the treatment of the bites of reptiles, the stings of insects, and for diarrhea and various other ailments. Within the last few years the plant has been used in one of the most talked-of developments in medicine, the tranquilizers.

This is a technical publication and another illustration of the wide field in which the Garden staff and students work. Dr. Woodson is a taxonomist, a specialist in naming plants, and the world authority on the Flora of Panama and on the milkweed and dogbane families. Rauwolfia belongs to the dogbane family and for several years Dr. Woodson has been studying the kinds of Rauwolfia for a large drug company. The first of the four chapters is Dr. Woodson's report; a very scholarly and readable one, for Dr. Woodson is one of those rare biologists who knows how to write well. He tells of the different species of Rauwolfia, their distribution, native uses and names, and how to identify the roots of some of the commonly available species. This is basic work, for a proper identification of the plant materials is essential before useful studies of the drugs can be completed or the raw materials obtained and standardized drugs prepared for the market.

The second chapter discusses the crude drugs of each of the common kinds of Rauwolfia and the other two chapters are on the chemistry and the effects of the Drugs.—Hugh Cutler

Corn and Its Early Fathers. By Henry A. Wallace and William L. Brown. 134 pp., 27 pp. illustration. The Michigan State University Press. East Lansing, Michigan, 1956. Price $3.75.

THIS IS AN unusual book for it combines botany, history, philosophy, and economics in one small well-written volume. The authors begin by telling what a corn plant is and then trace corn from its origin down to the present and go on to hint what the corn of the future might be like.

Henry Wallace was one of the first men to recognize the importance of hybrid corn and he played a large part in the development and spread of hybrid corn in this country. William Brown is the director of research of one of the largest hybrid corn companies. He is also one of the many graduates of the Henry Shaw School of Botany and the Missouri Botanical Garden who has become outstanding in his field. Dr. Brown's studies at the Garden were mainly on problems dealing with grasses and much of the work he does now is basic research, part of a long-range plan for improving the Americas' most unusual grass—corn. The authors collaborate well to give a dramatic history of the most important American corn plant and of people who worked with it.

—Hugh Cutler

The Complete Book of Greenhouse Gardening. By Henry T. Northen and Rebecca T. Northen. 332 pages, 20 pages of index. The Ronald Press Co., New York, 1956. Price $6.50.

ONE OF THE objectives set forth in the preface is filled in nineteen tightly written pages that give detailed suggestions for planning, building, and equipping a greenhouse. The next five chapters state the basic facts related to management of the greenhouse, soils and nutrition, growing plants from seed, and other methods of plant propagation. The following three chapters tell how to control shape, size, and flowering time of several kinds of plants. Since the greenhouse climate favors growth of certain plant pests, several kinds of insect pests are discussed in a chapter of 14 pages which includes line drawings of the thirteen insects that cause most of the grief, and tabulates the insecticides of value. Formulae for making from one to ten gallons of insect spray are given. There is also a chapter on the common plant diseases with a tabulation of twenty-four kinds of plants and the symptoms and methods of controlling the various diseases common to each.

Information regarding the production of both common and unusual cut flowers is discussed in separate chapters. For both, space requirements, the time to sow seed, and normal flowering times are given in concise tables. A chapter on pot-plants gives brief but pertinent information on sixteen different flowers ranging from the common Chrysanthemum to the less familiar, albeit good, greenhouse performers, such as Streptosolen and Grevillea. Pelargoniums, including some unusual geraniums, are covered in well-written detail and will add much to the knowledge of people who "have raised geraniums for years".

Just in case the greenhouse owner doesn't have his greenhouse bulging at

the seams with the plants normally known as greenhouse specimens, a separate chapter shows how well a greenhouse may be used to facilitate beautifying outdoor beds and producing "a variety of delicious vegetables". The last chapter tells of greenhouse-grown vegetables which the authors aver "are tastier than those purchased at the store". The several line drawings and tabulations in each chapter add to the completeness of the subject matter, for the amateur will surely appreciate knowing many details about several important plants, rather than to know less about more kinds. There are also several pages of excellent black and white pictures which illustrate many 'how-to-do' paragraphs.

The authors are at their best throughout most of the pages, as they state fact after fact in clear, easily understood language. Even in the chapter on Managing your Greenhouse the paragraphs are mostly facts, and only traces of theory and opinion can be found. They say definitely what most gardeners believe—"To grow plants to perfection nothing takes the place of human skill, care and judgment . . . raising plants then becomes an art, an opportunity for one to develop his own skill." This book was written by teachers who know their subject and pupils equally well. It is a good book in which to browse when one's greenhouse results are somewhat less than satisfying. —C. Barbre

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SOME FACTS ABOUT SHAW'S GARDEN

The Missouri Botanical Garden (the official name chosen by Mr. Shaw) carries on the garden established by Henry Shaw over a century ago at TOWER GROVE, his country home. It is a private institution and has no support from city or state. The old stone walls and cast-iron fences, the Linnaean House, the Museum, the Mausoleum, and the TOWER GROVE mansion all date from Mr. Shaw's time. Since his death, as directed in his will, the Garden has been in the hands of a Board of Trustees who appoint the Director.

The Garden is open every day in the year (except New Year's and Christmas) from nine A. M. until seven P. M. spring to fall and until six in the winter time though the greenhouses close at five. TOWER GROVE, itself, Mr. Shaw's old country home, is open from one until four, admission twenty-five cents, with special guides. The Garden is nearly a mile long and has several entrances. The Main Entrance, the one most used by the general public, is at Tower Grove and Flora Place on the Sarah bus line (No. 42). The Park Southhampton buses (No. 80), direct from downtown, pass within three blocks of this entrance and stop directly across the street from the Administration Building at 2315 Tower Grove Avenue. The latter is the best entrance for students, visiting scientists, etc. It is open to such visitors after 8:30 A. M., but is closed on Saturdays, Sundays, and holidays. The step-in gate (more or less concealed by the big Cleveland Ave. gate, 2221 Tower Grove) is nearly always open, and there is a service entrance on Alfred Avenue, one block south of Shaw Avenue.

Since Mr. Shaw's time an Arboretum has been developed at Gray Summit, Mo., adjacent to State Highways 50 and 66. It is open every day in the year and has auto roads as well as foot trails through the wild-flower reservation. There is a pinetum and an extensive display of daffodils and other narcissi which are at their best in April.